

CLAIMS

1. A method for oxidation of a surface of an object to be processed in a single processing container which can contain a plurality of objects to be processed, at least a nitride film being exposed on said surface, said method characterized by performing said oxidation wherein:

active hydroxyl species and active oxygen species are mainly used in a vacuum atmosphere;

a processing pressure is determined to be 133 Pa or below; and

a processing temperature is determined to be 400°C or above.

2. A method for oxidation of an object to be processed according to claim 1, characterized by feeding an oxidizing gas and a reducing gas into said processing container respectively by separate gas supply systems in order to produce said active oxygen species and said active hydroxyl species.

3. A method for oxidation of an object to be processed according to claim 2, characterized in that: said oxidizing gas includes one or more gasses selected from a group of O<sub>2</sub>, N<sub>2</sub>O, NO and NO<sub>2</sub>.; said reducing gas is H<sub>2</sub> gas; and H<sub>2</sub> concentration inside said processing container is 40% or below.

4. A method for oxidation of an object to be processed according to any one of claims 1 to 3, characterized in that a nitride film and silicon are both exposed on said surface of said object to be processed.

5. A method for oxidation of an object to be processed according to claim 3 or 4, characterized in that said H<sub>2</sub> concentration is within the range from 5 to 33%.

6. A method for oxidation of an object to be processed according to any one of claims 1 to 5, characterized in that said processing temperature is within the range from 800 to 1,000°C.

7. A method for oxidation of an object to be processed according to any one of claims 1 to 6, characterized in that, prior to said oxidation processing, said nitride film is formed to have an extra thickness corresponding to a thickness of the surface of said nitride film to be oxidized.

8. A method for oxidation of an object to be processed according to any one of claims 1 to 7, characterized in that said nitride film is a silicon nitride film (SiN).